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The Effect of Opportunity Index on Mortality from Hematological Malignancies Across the United States from 2018-2022

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Introduction

- Hematologic malignancies are among the most prevalent cancers in the United States
- Their relationship with social determinants of health remains underexplored.
- Existing research has examined various aspects of social determinants, but there is a gap in applying comprehensive tools like the Opportunity Index—an integrated measure of access to education, community resources, and employment[1]—to study their impact on mortality from these cancers.
- This study explores how the Opportunity Index is associated with mortality from hematologic malignancies.

Methods

- We conducted a cross-sectional study using mortality data from the CDC's Wide-ranging Online Data for Epidemiologic Research database from 2018-2022.[2]
- The study examined deaths due to all hematological malignancies and the top three most prevalent hematological malignancies among adults ≥35 years.
- These data were linked with the 2019 Opportunity Index for US states and D.C., with scores categorized into quartiles.
- We analyzed the association between Opportunity Index scores and Age-Adjusted Mortality Rates (AAMR) for these malignancies using Pearson's correlation and linear regression models.

Table 1: Summary of Opportunity Index Scores and Age-Adjusted Mortality Rates for Hematological Malignancies

Opportunity Index	Mean ± SD	p
Overall	53.6 ± 5.3	
Health Score	50.8 ± 8.8	
Community Score	50.6 ± 7.2	
Education Score	54.9 ±5.6	
Economic Score	58.2 ± 5.0	
Age-Adjusted Mortality Rates		
All Hematological Malignancies	27.4 ± 2.1	
Gender		
Male	35.8	<0.0001
Female	20.8	
Race		
American Indian or Alaska Native	19.6	<0.0001
Asian	15.9	
Black or African American	28.1	
More than one race	14.7	
Native Hawaiian or Other Pacific Islander	20.1	
White	27.9	
Multiple Myeloma	5.9 ±0.7	
Non-Hodgkin's Lymphoma	3.7 ± 0.6	
AML	4.9 ± 0.6	

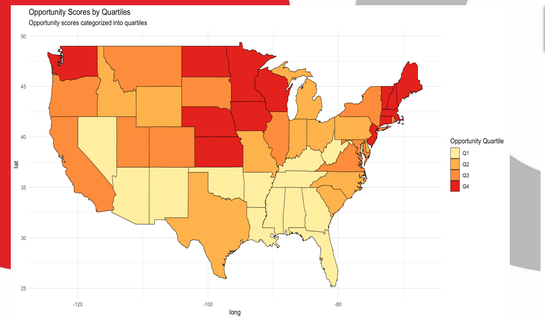
Table 2: Age-Adjusted Mortality Rates Across Opportunity Score Quartiles for Hematological Malignancies

Age-Adjusted Mortality Rates (mean ± SD)	Opportunity Scores			
	Q1	Q2	Q3	Q4
Overall	27.7 ± 2.6	27.9 ±1.5	26.3 ± 2.1	27.5 ± 1.9
Multiple Myeloma	6.1 ± 0.7	6.2 ± 0.9	5.7 ± 0.8	5.6 ± 0.4
Non-Hodgkin's Lymphoma	4.2 ± 0.6	3.6 ±0.6	3.4 ± 0.5	3.5 ± 0.5
AML	4.5±0.6	5.0±0.5	4.8±0.4	5.2±0.5

Table 3: Comparison of Age-Adjusted Mortality Rates Across Opportunity Score Quartiles for Hematological Malignancies

Age-Adjusted Mortality Rates (mean ± SD)	Opportunity Scores			
	Q1	Q2(95% CI)	Q3(95% CI)	Q4(95% CI)
Overall	Ref.	0.24(-1.4,1.9)	-1.39(-3.1,0.3)	-0.22(-1.9,1.4)
Multiple Myeloma	Ref.	0.10(-0.5,0.7)	-0.35(-0.9,0.2)	-0.44(-1,0.1)
Non-Hodgkin's Lymphoma	Ref.	-0.62(-1.0, -0.2)	-0.74(-1.2, -0,3)	-0.72(-1.2, -0.3)
AML	Ref.	0.49(0.1,0.9)	0.34(-0.06,0.7)	0.75 (0.4,1.1)





Results

- Males had a significantly higher AAMR (35.8) compared to females (20.8, p<0.0001).
- States with the highest opportunities were mainly clustered in the Midwest and Northeast while the lowest scores were in the south
- Although there was a negative correlation in AAMR overall with opportunity scores, this association lacked statistical significance (r = -0.11, p=0.45).
- NHL demonstrated a significant negative correlation with opportunity scores (r = -0.49, p<0.01), with significant decreases observed across opportunity quartiles (Q4: -0.7, 95% CI: -1.2 to -0.3) compared to Q1.

Conclusion

Our study revealed a significant negative association between the Opportunity Index and AAMR for NHL, indicating that higher opportunity scores are linked to lower mortality rates. While the correlation for hematologic malignancies overall lacked statistical significance, the observed negative trend and the NHL findings suggest that improving education, community resources, and employment can lead to improved health outcomes. Policymakers should prioritize addressing social determinants of health to reduce cancer mortality.

References

- Opportunity Index [Internet]. [cited 2024 Jul 31]. Data & Scoring. Available from: https://opportunityindex.org/methods-sources/
- General Help for CDC WONDER [Internet]. [cited 2024 Jul 5]. Available from: https://wonder.cdc.gov/wonder/help/main.html#What%